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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,135	12/09/2003	Takeo Eguchi	SON-2864	3183
23353	7590	12/09/2005	EXAMINER	
RADER FISHMAN & GRAUER PLLC LION BUILDING 1233 20TH STREET N.W., SUITE 501 WASHINGTON, DC 20036			NGUYEN, LAMSON D	
			ART UNIT	PAPER NUMBER
			2861	

DATE MAILED: 12/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/730,135

Applicant(s)

EGUCHI ET AL.

Examiner

Lamson D. Nguyen

Art Unit

2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 17-22, 26 and 27 is/are rejected.
- 7) ☒ Claim(s) 15, 16 and 23-25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/06/04, 04/26/04</u> | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-14, 17-19, 21-22, 26-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Logan et al. (4,575,730).

***Logan et al teach an inkjet print head comprising:***

#### **Claim 1:**

- a head wherein deviation of discharge direction of a liquid droplet discharged from a liquid discharge portion having a nozzle, can be controlled so as to be selected from a plurality of directions along a predetermined direction (figure 2 teaches printhead with nozzles 46; figure 5c teaches ink drop flight paths are vertically randomized (column 4, lines 59-65), wherein a plurality of liquid droplets are discharged so as to land on each pixel region for forming a pixel corresponding to said pixel region, and wherein a target landing position of a liquid droplet which is to be discharged on each pixel region is determined at random (figure 4 teaches pixel 38 comprises 9 dots; figure 5c teaches positions of the ink drops are randomized), and wherein the discharge direction of said liquid droplet which is to be discharged from said liquid

discharge portion is controlled such that said liquid droplet lands at said determined target landing position (figure 5c)

**Claims 2, 6, 7, 9-13:**

- a maximum number of N (N denotes a positive integer) liquid droplets are discharged so as to land on each pixel region for forming a pixel corresponding to said pixel region (figure 5a teaches pixel region, figure 4 defines a pixel comprises 3x3 in drops), and wherein M ( M denotes an integer of 2 or more) different landing position candidates forming an array in said predetermined direction are determined such that at least a part of the landing liquid droplet region corresponding to each landing position candidate is included within said pixel region (figure 5c teaches a pixel region CAB where a number of drop landing positions are randomized in the vertical direction) , and wherein a target landing position of a liquid droplet is selected at random for each liquid droplet which is to be discharged from said liquid discharge portion, from an M number of said liquid landing position candidates (figure 5c teaches vertically randomized drop positions in pixel region CBA), and wherein the discharge direction of said liquid discharge portion is controlled such that said liquid droplet lands at said determined target landing position (figure 5c)

**Claim 3:**

- wherein an N number of different landing position candidates forming an N number of different landing position candidates forming an array in a direction different from said predetermined direction are determined such that at least a part of the landing liquid droplet region corresponding to each landing position candidate is included within said pixel region (figure 5c teaches a pixel region CAB where a number of drop landing positions are randomized in the vertical direction), and wherein in the event that the number of the liquid droplets which are to be discharged onto a pixel region is equal to or greater than 1, and is less than N, a target landing position is selected at random from said liquid landing position candidates (figure 5c teaches a pixel region CAB where a number of drop landing positions are randomized in the vertical direction) , and wherein a liquid droplet is discharged so as to land at said determined landing position (figure 5c).

**Claim 4:**

- wherein control of said M number of target landing position candidates is performed using multi-bit signals, and wherein said control system has a configuration wherein terminals of all said ink discharge portions for controlling the same bit are connected one to another for controlling the discharge direction of each ink discharge portion, or has a configuration wherein the discharge directions of all said ink discharge portions are

controlled using the serialized signals. ( column 5, lines 65-column 6, lines 1-10)

**Claim 5:**

- wherein said head has a configuration wherein a liquid droplet can be discharged from a liquid discharge portion so as to land on the pixel region corresponding to the target landing position in a case of discharge being performed without deviation, from another liquid discharge portion near said liquid discharge portion (figure 5b), and wherein in the event that two or more liquid droplets are discharged onto a pixel region, said ink liquid droplets are discharged from at least said two different liquid discharge portions positioned close one to another, and wherein at least one of said liquid discharge portions discharge a liquid droplet with deviation (figure 5c)

**Claims 8/2/6/7:**

- wherein said liquid discharge device includes a plurality of heads, and wherein different liquids are supplied to each of the heads (column 3, lines 45-52, figure 1), a plurality of droplets are discharged from said liquid discharge portions of a plurality of said heads so as to land on each pixel region for forming a pixel corresponding to said pixel region (figures 5a-c)

**Claim 14:**

- discharge direction varying means for controlling the discharge direction of a liquid droplet discharged from said nozzle of each liquid discharge portion such that deviation of the landing position occurs in the predetermined direction (figure 7, randomizing circuit means 80)
- first discharge control means for performing discharge control using said discharge direction varying means such that ink droplets are discharged from at least two different liquid discharge portions positioned close one to another, in the discharge directions different one from another, so as to land at the same pixel column or a pixel (figure 5b); and
- second discharge control means for performing discharge control using said discharge direction varying means such that a landing position is selected for each liquid-droplet discharge from said liquid discharge portion, from an M number of different landing position candidates forming an array in the predetermined direction, determined such that at least a part of the landing liquid droplet region corresponding to each landing position candidate is included within said pixel region, and a liquid droplet is discharged so as to land at said determined landing position (figure 5c)

**Claim 17:**

- wherein said second discharge control means selects a landing position from said M different landing position candidates at random (figure 5c)

**Claim 18:**

- a third discharge control means for performing control of liquid discharge such that said N different landing position candidates forming an array in a direction different from said predetermined direction, are determined such that at least a part of the landing liquid droplet region corresponding to each landing position candidate is included within said pixel region, and in the event that the number of the liquid droplets which are to be discharged onto a pixel region is equal to or greater than 1, and is less than N, a target landing position is selected from said N different liquid landing position candidates, and a liquid droplet is discharged so as to land at said determined landing position (figure 5c teaches a pixel region CAB where a number of drop landing positions are randomized in the vertical direction; figure 5c teaches a pixel region CAB where a number of drop landing positions are randomized in the vertical direction)

**Claim 19:**

- third discharge control means for performing control of liquid-droplet discharge such that said N different landing position candidates forming an



array in a direction different from said predetermined direction, are determined such that at least a part of the landing liquid droplet region corresponding to each landing position candidate is included within said pixel region, and in the event that the number of the liquid droplets which are to be discharged onto a pixel region is equal to or greater than 1, and is less than N, a target landing position is selected at random from said N different liquid landing position candidates, and a liquid droplet is discharged so as to land at said determined landing position (figure 5c teaches a pixel region CAB where a number of drop landing positions are randomized in the vertical direction; figure 5c teaches a pixel region CAB where a number of drop landing positions are randomized in the vertical direction)

**Claim 21:**

- A liquid discharge device according to claim 14, wherein a plurality of said heads are arrayed in a particular direction so as to form a line head (column 3, lines 50-53, figure 1)

**Claim 22:**

- A liquid discharge device according to claim 14, wherein said first discharge control means and said second discharge control means are disposed on said head or a board for controlling or driving said head (figure 6a)

**Claim 26:**

- A liquid discharge method for discharging a plurality of liquid droplets so as to land on each pixel region for forming a pixel corresponding to said pixel region, using a head including a plurality of liquid discharge portions, each having a nozzle, arrayed in a predetermined direction, wherein the discharge direction of a liquid droplet discharged from said nozzle of said liquid discharge portion is controlled so as to be selected from a plurality of discharge directions such that deviation of the landing position occurs in said predetermined direction, and wherein at least two different liquid discharge portions discharge liquid droplets in directions different one from another such that a plurality of liquid droplets land on said one pixel region, and wherein a target landing position of a liquid droplet which is to be discharged on a pixel region is selected from landing position candidates at random, and wherein the discharge direction of a liquid droplet which is to be discharged from said liquid discharge portion is controlled such that said liquid droplet lands at said determined target landing position (figure 5c teaches a pixel region CAB where a number of drop landing positions are randomized in the vertical direction; figure 5c teaches a pixel region CAB where a number of drop landing positions are randomized in the vertical direction)

**Claim 27:**

- A liquid discharge device for discharging a maximum of  $N$  ( $N$  denotes a positive integer) liquid droplets so as to land on each pixel region for forming a pixel corresponding to said pixel region, using a head including a plurality of liquid discharge portions, each having a nozzle, arrayed in a predetermined direction, wherein the discharge direction of a liquid droplet discharged from said nozzle of each liquid discharge portion is controlled such that deviation of the landing position occurs in said predetermined direction; and wherein discharge control is performed such that ink liquid droplets are discharged from at least said two different liquid discharge portions positioned close one to another, in the discharge directions different one from another, so as to land at the same pixel column or the same pixel region for forming a pixel column or a pixel; and wherein discharge control is performed, using said discharge direction varying means such that a landing position is selected for each liquid-droplet discharge from said liquid discharge portion, from  $M$  ( $M$  denotes an integer of 2 or more) different landing position candidates forming an array in said predetermined direction, determined such that at least a part of the landing liquid droplet region corresponding to each landing position candidate is included within said pixel region, and a liquid droplet is discharged so as to land at said determined landing position (figure 5c teaches a pixel region CAB where a number of drop landing positions are randomized in the vertical direction; figure 5c teaches a pixel region CAB

where a number of drop landing positions are randomized in the vertical direction; figure 7, randomizing circuit means)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Logan in view of Ishinaga et al. (5,754,201).

***Logan teaches all claimed features of the invention in addition to:***

- discharge direction varying means controls the discharge direction of a liquid droplet discharged from the nozzle by controlling the difference in energy (column 5, lines 65-68-column 6, lines 1-10)

However, Logan does not explicitly teach a liquid chamber for storing liquid which is to be discharged, a plurality of energy generating devices for generating energy for discharging said stored liquid within the chamber from the nozzle and wherein the energy generating devices are arrayed within said liquid chamber in said predetermined direction

It is well-known in the art to have a plurality of energy generating devices disposed in a liquid chamber to eject ink droplets out as taught by Ishinaga (figures 5a-d).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the invention of Logan to incorporate the teaching of energy generating devices taught by Ishinaga for the purpose of producing different sized inkdrops.

***Allowable Subject Matter***

Claims 15-16 and 23-25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lamson D. Nguyen whose telephone number is 571-272-2259. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Talbott can be reached on 571-272-1934. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2861

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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LAMSON NGUYEN  
PRIMARY EXAMINER  
12/01/05